REMARKS/ARGUMENTS

Reconsideration is respectfully requested of the Official Action of October 12, 2004, relating to the above-identified application.

It is noted that the objection to the disclosure set forth in the Office Action of May 5, 2004, has been withdrawn. It is further noted with appreciation that the rejection of Claims 3 and 6 under 35 U.S.C. § 112 has been overcome.

Claims 1, 2, 4 and 5 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over *Uhlemann* (US 4,946,654) in view of *Abraham* (WO 01/25146).

Claims 3 and 6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Uhlemann* ('654) in view of *Abraham* (WO 01/25146) and further in view of *Abraham*.[1]

These rejections are traversed and will be discussed together. The Official Action points out that the *Uhlemann* patent teaches a process for preparing granulates with a fluidized bed spray granulation at atmospheric pressure in the presence of a fluidizing gas and for solidifying the spray product. The fluidizing gas can be, for example, nitrogen. *Uhlemann* mentions a number of inorganic compounds that can be used but fails to show the particular inorganic chemicals; namely, alkali metal sulfides, as set forth in the present claims. This is admitted in the Office Action of May 5, 2004 at pg. 5, last sentence.

The Official Action relies on *Abraham* for a teaching of the preparation of anhydrous alkali metal sulfides by spray drying. However, the record does not establish the equivalence or

[1] It is not clear what other *Abraham* reference the Office Action refers to, as the record lists only WO 01/25146.

interchangeability of anhydrous alkali metal sulfides of *Abraham* and the "inorganic chemicals" of *Uhlemann*.

The Official Action concludes that it would have been obvious to one of ordinary skill in the art to have selected an alkali metal sulfide to use in place of the inorganic chemical in the *Uhlemann* patent and then to carry out a fluidized bed spray granulation process. Applicants note that *Abraham* does not disclose a fluidized bed spray process, but instead discloses the spray drying of alkali metal sulfides. A spray dryer is not equivalent to or interchangeable with a fluidized bed process. And processes that utilize the one type of equipment would not necessarily function with the other type of equipment.

A person skilled in the art would have known that alkali metal sulfides must be handled in such a way as to prevent melting or agglomeration. In other words, the alkali metal sulfide must be prepared so that very large particles or bodies are not formed because they cannot be kept in a fluidized state in the fluidized bed. Hence, a person skilled in the art would not have considered to replace the spray dryer by a fluidized bed granulation because the dwell time in the fluidized bed is much longer than the dwell time in a spray dryer as will be apparent from the following.

Comparison of Dwell Time of the Different Processes

Abraham spray drying process:

This process involves simply drying of sprayed droplets. No start filling or seed material is needed. The dwell time in a spray dryer corresponds to the flying time of the sprayed droplets traveling through the empty chamber. The droplets and the particles resulting from the drying of the droplets follow the gas flux.

Calculation: volume drying chamber/volume stream drying gas = dwell time

Example: dimensions drying chamber; diameter = 0.91m; 3.5 m length cylindrical; 1.0 m length conical; *Abraham*, pg. 13, lines 9-10

Volume drying chamber = 0.91 x 0.91 x 3.14/4 x 3.5+3.14/3 x 0.455 x 0.455 x 1 = 2.5 m^3 (by calculation from the above)

Volume stream drying gas = 3.7 m^3/min; *Abraham*, pg. 13, line 16

Dwell time = 2.5 m^3/3.7 m^3/min = 0.67 min

Present application: fluid bed spray granulation process:

Droplets build a fluid layer on the surface of the seed material and dry then as a solid layer. The granules are growing through the process. Therefore, a start filling or seed material is needed. Dwell time corresponds to the mass hold up in the process.

Calculation dwell time via mass and heat balance (in a continuous mode dwell time = hold up/through put)

Example: start or seed filling 500 g product, see page 8 [0045]; 1500 g final sprayed solids Na_2S, page 9 [0046]; 100 m^3h drying N_2, page 9/table; 400° C inlet temperature, page 9/table; 250° C exhaust temperature, page 9/table; 41% concentration Na_2S, page 8; 1.5% moisture final product, page 9/table; 120° C temperature melt page 8 [0042]

Energy input + volume stream drying gas x density drying gas x difference temperature x cp drying gas

= 100 m^3/h x 1.25 kg/m^3 150 K x 1kJ/kg = 18750 kJ/h

evaporated water = 1500 g x 98.5%/41% = 3604 g water

evaporation energy = 3604 g x 2.5 kJ/g = 9010 kJ

heating vapor to outlet temperature = 3.604 kg x 1.9 kJ/kg K x (250° - 120°) K = 890 kJ

heating solids to outlet temperature = 1.5 kg x 1.8 kJ/kg K x (250° - 120°) K = 390 kJ

sum energy needed = 10289 kJ

dwell time = sum energy/energy input = 10289 kJ/18750kJ/h = 0.55 h

Thus, the dwell time for carrying out a representative example of the present invention is more than one-half hour, whereas the spray drying method of *Abraham* has a dwell time of less than one minute!

The principal reference, *Uhlemann*, discloses a dry bed spray granulation system. It has been established that a person skilled in the art would not substitute the spray dryer by the fluidized spray granulation because the dwell time in the fluidized bed reactor is very long. That is, the alkali metal sulfides can melt or agglomerate, and thereby form very large particles which cannot be kept in a fluidized state. Consequently, applicants respectfully submit that there is no motivation for a person skilled in the art to consider that fluidized bed granulation and spray drying techniques are interchangeable and that materials used in one such process could be easily used in the other process. That is, a person skilled in the art would not necessarily conclude that the alkali metal sulfide used in the spray drying operation of *Abraham* could be used with equally good results in the fluidized bed granulation system of *Uhlemann*. No evidence of interchangeablity is of record; see, *ex parte Brouard* 201 USPQ 538 (POBA 1977); see also, *In re Huellmantel*, 139 USPQ 496 (CCPA).

Certainly there is lacking a teaching or suggestion that the claimed combination would have a reasonable chance of success.

In determining the propriety of the Patent Office case for obviousness in the first instance, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the

proposed substitution, combination, or other modification. *In re Linter,* 458 F.2d 1013, 173 USPQ 560, 562 (CCPA 1972).

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine,* 837 F2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones,* 958 F2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

In view of the foregoing, applicants respectfully submit that no *prima facie* case of obviousness has been established by the Official Action; and, therefore, the rejections based thereon should be withdrawn and the claims allowed.

Favorable action at the Examiner's earliest convenience is respectfully requested.

Respectfully submitted,

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